

Application No.: 10/802,581
Amendment and Response dated June 19, 2007
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Remarks/Arguments:

Introduction

Claims 1-16 are pending.

Independent claim 1 is directed to a fibre-reinforced building article having fire protection properties. The fibre-reinforced building article comprises a matrix of a binding material comprising an aluminous cement, a carboxylic ether polymer based plasticizer, a fugitive material, filler, and alkaliresistant glass fibers, and at least one fiber layer of alkaliresistant glass fibers, incorporated in said matrix.

Independent claim 10 is directed to a method for manufacturing a fibre-reinforced building article having fire protection properties. The method comprises the steps of casting an aqueous mixture of binding material comprising an aluminous cement, a fugitive material, filler, alkaliresistant fibers and a carboxylic ether polymer based plasticizer, into a mould, and positioning additional alkaliresistant glass fibers in at least one fiber layer in the mould during casting, in order to obtain a preform and allowing the thus obtained preform to dry.

Section 103 Rejections

Claims 1-9 are rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over U.S. Patent No. 4,831,062¹ to von Bonin (hereinafter “von Bonin ‘062”) in view of U.S. Patent No. 4,992,481 to von Bonin (hereinafter “von Bonin ‘481”) and in further view of U.S. Patent No. 5,214,200 to Waller (hereinafter “Waller”). Claims 10-16 are rejected under 35 U.S.C § 103(a) as allegedly being unpatentable over von Bonin ‘062 in view of von Bonin ‘481, in

¹ It is respectfully submitted that the office action incorrectly cited the first von Bonin reference as U.S. Patent No. 4,831,061. US 4,831,061 is to Hilaire et al and is apparently not relevant. We believe the correct citation to the first von Bonin reference is U.S. Patent No. 4,831,062.

further view Waller and in further view of European Patent Application No. EP 1 001 000 A1 to Ermanno Magni (hereinafter "Magni"). Applicant respectfully traverses.

Patentability of Claims 1-9:

von Bonin '062 is directed to intumescent materials obtained from the reaction of polyisocyanates with phosphorus-containing condensation products containing at least two hydroxyl groups and boron oxides and /or dehydration products of boric acids. (von Bonin '062, column 1, lines 27-32). The polyisocyanate is described as having the formula of $Q(NCO)_m$, where m represents a number from 2 to 4, and Q represents an aliphatic hydrocarbon radical having 2 to 18 carbon atoms, a cycloaliphatic hydrocarbon radical having 4 to 15 carbon atoms, an aromatic hydrocarbon radical having 6 to 15 carbon atoms, or an aliphatic hydrocarbon radical having 8 to 15 carbon atoms. (von Bonin '062, column 1, lines 33-53). The phosphorus-containing condensation products containing at least two hydroxyl groups is described as having the formula of $(RO)_2PO-CH_2-N(CHX-CHX_1-OH)_2$, R is a C₁ to C₈ alkyl or a C₁ to C₈ hydroxyalkyl, and X and X₁, independently of one another, represent hydrogen or methyl. (von Bonin '062, column 3, lines 7-17). Useful boron oxides and /or dehydration products of boric acids are described as including H₃BO₃ and B₂O₃. (von Bonin '062, column 3, lines 33-36).

As acknowledged by the examiner, von Bonin '062 fails to teach or suggest the use of aluminous cement with its polyisocyanate/phosphorus-containing-condensation-products/boron-containing intumescent materials. The lack of any teaching to this aspect of the present invention, however, is not the only deficiency of von Bonin '062.

A further deficiency is that von Bonin '062 fails to teach or suggest the use of a carboxylic ether polymer based plasticizer. For example, von Bonin '062 specifically teaches that suitable plasticizers for its intumescent materials include plasticizers "of the phosphoric acid ester and/or phosphonic acid ester". (von Bonin '062, column 4, lines 14-16). While such

phosphoric acid ester and/or phosphonic acid ester plasticizers may be useful with von Bonin '062's polyisocyanate/phosphorus-containing-condensation-products/boron-containing intumescent materials, von Bonin fails to teach to or suggest that carboxylic ether polymer based plasticizers may be used with intumescent materials, in particular intumescent materials having aluminous cement.

Still further, von Bonin '062 describes the use "glass, particularly in bead or fibre form". (von Bonin '062, column 3, lines 57-58). von Bonin '062, however, fails to teach or suggest the use alkaliresistant glass fibers and at least one fiber layer of alkaliresistant glass fibers in its intumescent materials.

von Bonin '481 is directed to foam moldings containing a liquid flame-proofing impregnation. (von Bonin '481, abstract). The fire retardant elements of von Bonin '481 must include particular are moist, impregnated, compressible foam moldings, as follows:

Fire retardant elements according to the invention are moist, impregnated, compressible foam mouldings. The compressible foam mouldings are preferably soft polyurethane foams which can be compressed substantially reversibly (=elastic). However, they may also be other organic and/or inorganic foam mouldings, for example those based on asbestos, mineral fibres, silicone, phosphazene foams, mixed inorganic/organic foams, cellulose foams, protein foams, natural sponges, phenolic resin foams, urea resin foams, melamine resin foams, dicyandiamide resin foams or polyimide resin foams, foams based on polymers foamed in dispersion, solution or directly, such as natural or synthetic rubbers, polyolefins, polyacrylates, polyamides, polyethers, polyesters, poly(vinyl halides), poly(vinyl esters) or poly(vinyl ethers). (von Bonin '481, column 4, lines 8-23).

The elements of von Bonin '481 are substantially different from the articles of the presently claimed invention. The articles of presently claimed invention are not flexible foams.

The foam moldings of von Bonin '481 may contain a filler. Various flame-proofing fillers are mentioned, including the use of aluminous cement (von Bonin '481, column 6, line 57, to column 7, line 34). Nevertheless, the use of a flame-proofing filler in a soft polyurethane foam does not result in a building article comprising a matrix of an aluminous cement, as set forth in the present invention. Moreover, the person skilled in the art is specifically taught and instructed by von Bonin '481 to use a foam molding that is impregnated with a moist, flame-proofing impregnation that is flexible in this moist state and that is protected and stored against loss through moisture. The currently claimed fibre-reinforced building articles are already fully dried prior to installation. Clearly the differences between the teachings of von Bonin '481 and that of the current inventors are substantial.

Furthermore, while von Bonin '481 lists numerous foam molding for its articles, von Bonin '481 fails to teach or suggest that the materials of von Bonin '062, i.e., von Bonin's earlier filed patent, may be used with von Bonin's later filed patent, i.e., von Bonin '481. If one particularly skilled in the art, i.e., von Bonin, fails to teach or suggest that the von Bonin references may be combined, it is respectfully submitted that the examiner's reliance of one of ordinary skill in the art to combine these references is misplaced. The only possible motivation to combine these references is through impermissible hindsight reconstruction by the examiner.

Waller merely discloses a process for producing organic esters by reacting a carboxylic acid and a dialkyl ether under the presence of a particular catalyst, for example H1 or LiI. (Waller, abstract; column 3, line 45). Thus, the process of Waller concerns the catalyzed reaction of a carboxylic acid and a dialkyl ether. This process is not applied in the current invention. Furthermore, the process of Waller is used to produce methyl acetate. (Waller, abstract; column 4, lines 6-13) In the current invention, a polycarboxylic ether, for example Glenium 51, is used as hyperplasticiser for high performance concrete. (see Specification at paragraph [0011]). Waller, on the other hand, is making methyl acetate and the like, which are ordinary and rather flammable monocarboxylic esters. There is no reason to assume that the

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acetic acid esters made by Waller have any plasticizing effect; the steric hindrance which might stabilize cement particles is totally missing. It is respectfully submitted that Waller has no relevance to the art of plasticizers, in particular non-flammable plasticizers, and as such one of ordinary skill in the art would not combine it with the teachings of von Bonin. Thus, one of ordinary skill in the art has no motive whatsoever to combine the teachings of von Bonin '062, von Bonin '481 and Waller.

Still furthermore, the manufacturer, i.e., Degussa, of the preferred the carboxylic ether polymer based plasticizer, i.e., Glenium 51, of the present invention fails to disclose, teach or suggest that such a plasticizer may have ant fire retarding properties. (See, Glenium® 51 by Degussa, copy attached for the convenience of the examiner). For example, while Degussa lists many features and benefits of its Glenium 51, increased fire resistance properties is not mentioned. If one of ordinary skill in the art would expect that such material would possibly have fire retarding properties, then such properties would certainly have been listed by the manufacturer. Thus, it is only through hindsight reconstruction does this office action combine the applied references in an failed attempt to arrive at a *prima facie* case of obviousness as not reference teaches a fibre-reinforced building article comprising, *inter alia*, a carboxylic ether polymer based plasticizer.

Thus, von Bonin '062, Bonin '481 and Waller, individually or in combination, fail to teach or suggest the current invention as presently defined by claims 1 to 9. Reconsideration and withdrawal of the rejections of claims 1-9 are therefore respectfully requested.

Patentability of Claims 10-16:

Magni is directed to a process for providing fire protection. (Magni, page 2, line 30). The process of Magni includes the preparing of a slurry and the coating of a layer of unfired slurry onto a construction article. (Magni, page 2, lines 31-34). The coating is made from a

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mixture of kaolin, chalk, powdered isolating refractory brick, refractory filler, sawdust, aluminous cement and possibly Portland cement. (Magni, page 3, lines 29-30).

Thus, Magni fails to teach or suggest that its slurry may be cast into a mould as Magni is directed to a coating process for its slurry. Further, Magni fails to teach or suggest that its coating mixture may contain a plasticizer. More particularly, Magni fails to teach or suggest the use of a carboxylic ether polymer based plasticizer. Still further, Magni fails to teach or suggest the placing of alkaliresistant glass fibers in at least one fiber layers into a mould during the casting of its slurry to form a preform therefrom.

Method claim 10 specifies forming the building article as a preform first and allowing the preform thus obtained to dry. This is diametrically opposed to von Bonin '481, which rather applies a moist foam. Also in von Bonin '062 a foam is also specifically applied. von Bonin '062 concerns intumescent material obtained by reacting a polyisocyanate with a phosphorus-containing condensation product, and thus differs (substantially) from a product having a cement as matrix material. Waller, as explained above, does not disclose polycarboxylic ethers and/or the use of such products as plasticizer. Indeed, Waller does not say anything on plasticizers at all. Magni teaches a coating. Magni fails to teach or suggest the preparation of a fibre-reinforced building article and the method of making the same by casting a slurry. More specifically, Magni at page 2, lines 50-58, page 3, lines 2-22 and page 4, lines 36-38 does not refer to casting at all. Magni teaches the application of the slurry by (spray) coating, which is different from casting. The expression "casting" and/or a identical expression may not be found in Magni. Should one of ordinary skill in the art attempt to apply the teachings of Magni, this would never have lead to the preparation of the current building articles made by casting a suitable binder material in a mould to form a preform and allowing the same to be obtained by drying the preform. Thus, claims 10-16 therefore are patentably distinct over von Bonin '062 in view of von Bonin '481 in further view of Waller and in view of Magni.

Moreover, since Glenium 51 is not known as fire retardant it would not be obvious to one of ordinary skill in the art to use this plasticizer to have enhanced fire retarding properties for the matrix material. Since it would not be obvious to use, it definitely is not an optimizable feature as alleged by the office action.

Thus, Magni fails to cure the deficiencies of von Bonin '062, Bonin '481 and Waller. Therefore, the combination of von Bonin '062, Bonin '481, Waller and Magni fails to teach or suggest a method comprising, *inter alia*, the steps of casting an aqueous mixture of binding material comprising an aluminous cement, a fugitive material, filler, alkaliresistant fibers and a carboxylic ether polymer based plasticizer, into a mould, and positioning additional alkaliresistant glass fibers in at least one fiber layer in the mould during casting, in order to obtain a preform and allowing the thus obtained preform to dry.

Accordingly, it is respectfully submitted that von Bonin '062, Bonin '481, Waller and Magni, individually or in combination, fail to teach or suggest the current invention as presently stet forth in claims 10-16. Reconsideration and withdrawal of the rejection of claim 10-16 are respectfully requested.

Summary

Therefore, Applicants respectfully submit that independent claims 1 and 10, and all claims dependent therefrom, are patentably distinct. This application is believed to be in condition for allowance. Favorable action thereon is therefore respectfully solicited.

Should the Examiner have any questions or comments concerning the above, the Examiner is respectfully invited to contact the undersigned attorney at the telephone number given below.

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The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 08-2461. Such authorization includes authorization to charge fees for extensions of time, if any, under 37 C.F.R. § 1.17 and also should be treated as a constructive petition for an extension of time in this reply or any future reply pursuant to 37 C.F.R. § 1.136.

Respectfully submitted,



John S. Sopko
Registration No.: 41,321
Attorney for Applicants

HOFFMANN & BARON, LLP
6900 Jericho Turnpike
Syosset, New York 11791
(973) 331-1700

GLENIUM® 51

High range water reducing/superplasticizing admixture

CE Approved – Certificate No. 0086-CPD-469071
EN934 part 2 tables 3.1 and 3.2.**Description of Product**

GLENIUM® 51 is an admixture of a new generation based on modified polycarboxylic ether. The product has been primarily developed for the use in the concrete industry where the highest durability and performance is required.

GLENIUM® 51 is free of chloride & low alkali. It complies with EN 934 part 2. GLENIUM® 51 is compatible with all types of cement.

The new chemistry of GLENIUM 51

What differentiates GLENIUM® 51 from the traditional superplasticizers is a new, unique mechanism of action that greatly improves the effectiveness of cement dispersion. Traditional superplasticizers based on melamine and naphthalene sulphonates are polymers, which are absorbed by the cement granules. They wrap around the granules' surface areas at the very early stage of the concrete mixing process. The sulphonate groups of the polymer chains increase the negative charge of the cement particle surface and disperse these particles by electrical repulsion.

This electrostatic mechanism causes the cement paste to disperse and has the positive consequence of requiring less mixing water to obtain a given concrete workability. GLENIUM® 51 has a different chemical structure from the

traditional superplasticizers. It consists of a carboxylic ether polymer with long side chains.

At the beginning of the mixing process it initiates the same electrostatic dispersion mechanism as the traditional superplasticizers, but the side chains linked to the polymer backbone generate a steric hindrance, which greatly stabilises the cement particles' ability to separate and disperse. Steric hindrance provides a physical barrier (alongside the electrostatic barrier) between the cement grains. With this process, flowable concrete with greatly reduced water content is obtained.

Fields of Application

- The excellent dispersion effect makes GLENIUM® 51 the ideal admixture for the high quality concrete industry.
- The ability to work with an extremely low water/cement ratio allows for the manufacture of high performance concrete with high early (18-24 hours) and final strengths. Concrete of high density, low permeability is also produced.

Features and Benefits

- Flowable concrete with the lowest water/cement ratio without segregation or bleeding.
- Allows reduction of curing cycles - i.e. time or temperature.



GLENIUM® 51

- Possibility of elimination of steam curing.
- Allows concrete production at low temperature.

Features and Benefits

- Less vibration required even in case of congested steel reinforcement.
- Less workmanship required.
- Improves concrete surface finish and texture.
- Compared to traditional superplasticizers, the addition of GLENIUM® 51 will improve the physical properties and thus the durability of concrete:

- Initial and final compressive strength.
- Initial and final flexural and tensile strength.
- E-modulus.
- Adhesion to reinforcement and prestressed steel.
- Resistance to carbonation and chloride ion attack of concrete.
- Resistance to aggressive atmospheric conditions.

GLENIUM® 51 decreases

- Risk of shrinkage.
- Creep.

GLENIUM® 51 increases**Manufacturer's Stated Values**

SG	pH	Alkali %	Chloride %	Chlorine %
1.095	7.20	less than or equal to 4.0	less than or equal to 0.10	less than or equal to 0.10

Application Procedure**Compatibility of GLENIUM® 51****GLENIUM ACTIVATOR**

Where elimination of steam curing is intended (at ambient temperatures below 12°C) while still achieving high early strength to enable early demoulding within 24 hours, it may be necessary to add GLENIUM ACTIVATOR with GLENIUM® 51. The recommended dosage of GLENIUM ACTIVATOR is 1 litre per 100 kg of cement (binder). This combination guarantees a uniform and fast development of initial and final strength. At temperatures above 12°C the addition of GLENIUM ACTIVATOR is not required.

Like GLENIUM® 51, GLENIUM ACTIVATOR is free of chloride and is low alkali and is compatible with all types of cements.

Other combinations that are recommended:

- Air entraining agents (such as MICRO-AIR range) to optimise frost/thaw resistance.
- Silica fume for higher density.
- Expanding agents (such as for controlled shrinkage).
- Synthetic and steel fibres.
- Curing agents against too quick evaporation of mixing water.

GLENIUM® 51 is a ready to use admixture to be added to the concrete mix as a separate component.

Optimal concrete plasticising effect (and thus maximum mixing water reduction) is obtained if GLENIUM® 51 is added into the concrete after the first 50-70% of the water has been mixed.

Avoid adding the admixture to the dry aggregate or sand. In all cases the best effect is achieved when GLENIUM® 51 is added first and the other admixtures subsequently.



Dosage

Depending on specific mix design and requirements, the normally recommended dosage rate is between:

By Volume - 0.2 to 1.0% per 100 Kg of cement (binder).

By Mass - 0.219 to 1.095 kg per 100 Kg of cement (binder).

Other dosages may be recommended in special cases according to specific job conditions (consult Degussa Construction Chemicals (UK) Technical Services Department for advice).

Packaging

GLENIUM® 51 is available in 205 litre drums, 1000 litre container or in bulk.

Storage

GLENIUM® 51 must be stored in a place where temperature does not drop below +5°C. If product has frozen, thaw at +3°C and agitate until completely reconstituted. Store under cover, out of direct sunlight and protect from extremes of temperature. Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult Degussa Construction Chemicals (UK) Technical Services Department.

Shelf Life

Up to 12 months if stored according to manufacturer's instructions in unopened containers.

GLENIUM® 51 Degussa Construction Chemicals UK Version 4

Health and Safety

'For full information on Health and Safety matters regarding this product the relevant Health and Safety Data Sheet should be consulted.'

The following general comments apply to all products.

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs, (which may also be tainted with vapour until the product is fully cured and dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Keep away from children and animals. Reseal containers after use.

Spillage

Chemical products can cause damage; clean spillage immediately.

Disclaimer:

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

